

**AMENDMENTS TO THE CLAIMS**

1. (Currently amended): An updating system for an encrypted key for a wireless LAN in which ~~one or more wireless access point is points~~ (APs) are provided on a LAN, said ~~wireless access point~~ AP's being wirelessly connected to a ~~plurality of one or more wireless access terminal devices (STAs)~~ and in which data is encrypted and transmitted between the ~~wireless access point~~ AP or APs and the ~~plurality of wireless access terminal devices, STA or STAs to effect communication~~ (encrypted communication): said system comprising:

~~a key management server (SV) device; said key management server (SV) device, LAN-connected to said wireless access point~~ the AP, comprising:

~~a SV storage unit for holding k encrypted keys used in the encrypted communication between said wireless access point~~ AP or APs and the ~~plurality of wireless access terminal devices~~ STA or STAs, where k is not less than 1; and

~~an encrypted key generating unit generating said k encrypted keys~~ key and storing the generated ~~k encrypted keys~~ key in said SV storage unit;

~~wherein said key management server~~ SV device ~~generating said encrypted key in said encrypted key generating unit to store the generated encrypted key in said SV storage unit, said SV device controlling~~ said encrypted key generating unit to update ~~one of said encrypted keys~~ stored in said SV storage unit ~~and delivering~~ to deliver the updated encrypted key to said ~~wireless access point~~ AP and to said ~~plurality of wireless access terminal devices~~ STA or STAs.

2. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 1 wherein:

upon updating said encrypted key stored in said ~~SV~~-storage unit, said key management server~~SV~~ device generates and updates a sole encrypted key at a time by said encrypted key generating unit.

3. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 1 wherein:

upon updating said encrypted key stored in said ~~SV~~-storage unit, said key management server~~SV~~ device generates a sole encrypted key at a time by said encrypted key generating unit and sequentially updates k encrypted keys stored in said ~~SV~~-storage unit one-by-one at a preset interval.

4. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 1 wherein:

where k is greater than 1, said key management server~~SV~~ device sequentially updates all except a remaining one~~(k-1)~~ of said k encrypted keys stored in said ~~SV~~-storage unit one-by-one at a preset first interval, said key management server~~SV~~ device updating the remaining one key at a second interval which is longer than said preset first interval~~that for said (k-1) encrypted keys~~.

5. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 2 wherein:

said wireless access point~~AP~~ comprises an updating unit updating an nth encrypted key, stored and managed by said wireless access point~~AP~~ or APs, on reception of a delivered nth encrypted key updated by said key management server~~SV~~ device, where  $1 \leq n \leq k$ , and where k is greater

than 1, and an encryption unit encrypting an encrypted key updating notification message, using an encrypted key other than said nth encrypted key, ~~for advising said STA or STAs of that effect;~~

each of said plurality of wireless access terminal devicesSTA comprising a key generating unit generating an STA-encrypted key updating requesting message on reception of said encrypted key updating notification message from said wireless access pointAP and an encryption unit encrypting said STA-encrypted key updating requesting message, using the same encrypted key as that used in said encrypted key updating notification message, to advise said AP of that effect; and

said wireless access pointAP also comprising a transmission unit advising said key management serverSV device of the STA encrypted key updating request on reception of said STA-encrypted key updating requesting message from said STA;

said key management serverSV device also comprising a verification unit verifying whether or not an encrypted key may be delivered to one of said plurality of wireless access terminal devicesSTA on reception of the STA encrypted key updating requesting message from said wireless access pointAP, and a delivery unit that delivers, if such verification is true, delivering to said wireless access pointAP the encrypted key addressed to said one of said plurality of wireless access terminal devicesSTA if it is verified that said encrypted key may be delivered to said STA.

6. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 2 wherein:

said wireless access point~~AP~~ comprises an updating unit updating an nth encrypted key, stored and managed by said wireless access point~~AP~~ or APs, on reception of a delivered nth encrypted key updated by said key management server~~device~~SV, where  $1 \leq n \leq k$ , and an encryption unit encrypting an encrypted key updating notification message, using an initially updated one of k encrypted keys stored and managed by said wireless access point~~AP~~, to advise said STA of that effect;

each of said plurality of wireless access terminal devices~~STA~~ comprising a generator unit generating an STA-encrypted key updating requesting message on reception of said encrypted key updating notification message from said wireless access point~~AP~~ and an encryption unit encrypting said STA-encrypted key updating requesting message, using the same encrypted key as that used to encrypt~~in~~ said encrypted key updating notification message, to advise said AP of that effect;

said wireless access point~~AP~~ also comprising a transmission unit advising said key management server~~device~~SV of the STA-encrypted key updating request on reception of said STA-encrypted key updating requesting message from said STA;

said key management server~~device~~SV also comprising a verification unit verifying whether or not an encrypted key may be delivered to one of said plurality of wireless access terminal devices~~STA~~ on reception of the STA encrypted key updating requesting message from said wireless access point~~AP~~ and a delivery unit that delivers, if such verification is true, delivering to said wireless access point~~AP~~ the encrypted key addressed to said one of said plurality of wireless access terminal devices~~STA~~ if it is verified that said encrypted key may be delivered to said STA.

7. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 5 wherein

~~said wireless access pointAP~~ comprises a generator unit generating an ~~STA~~ encrypted key delivery message on reception of an encrypted key addressed to said one of said plurality of wireless access terminal devicesSTA from said key management serverSV device; and

an encryption unit encrypting said ~~STA~~-encrypted key delivery message, using an encrypted key other than the nth encrypted key, ~~to advise said STA of that effect;~~

said one of said plurality of wireless access terminal devicesSTA also comprising an updating unit updating an nth encrypted key stored and managed by ~~said one of said plurality of wireless access terminal devicesSTA~~ on reception of an nth encrypted key by said ~~STA~~-encrypted key delivery message from said wireless access pointAP.

8. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 6 wherein

~~said AP~~wireless access point comprises a generator unit generating an ~~STA~~ encrypted key delivery message on reception of an encrypted key addressed to said ~~STA~~one of said plurality of wireless access terminal devices from said ~~SV~~key management server device; and

an encryption unit encrypting said ~~STA~~-encrypted key delivery message, using an encrypted key other than the nth encrypted key, ~~to advise said STA of that effect;~~

said STAone of said plurality of wireless access terminal devices also comprising an updating unit updating an nth encrypted key stored and managed by

said STAone of said plurality of wireless access terminal devices on reception of saidan nth encrypted key by said STA-encrypted key delivery message from said APwireless access point.

9. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 5 wherein:

said APwireless access point comprises a generator unit generating an STA encrypted key delivery message on reception of an encrypted key addressed to said STAone of said plurality of wireless access terminal devices from said SVkey management server device, and

an encryption unit encrypting said STA-encrypted key delivery message, using an initially updated one of k encrypted keys stored and managed by said APwireless access point, to advise said STA of that effect;

said STAone of said plurality of wireless access terminal devices also comprising an updating unit updating an nth encrypted key stored and managed by said STAone of said plurality of wireless access terminal devices on reception of an nth encrypted key by delivered said STA-encrypted key delivery message from said APwireless access point.

10. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 6 wherein:

said APwireless access point comprises:

a generator unit generating an STA-encrypted key delivery message on reception of an encrypted key addressed to said STAone of said plurality of wireless access terminal devices from said SVkey management server device, and

an encryption unit encrypting said STA-encrypted key delivery message, using an initially updated one of k encrypted keys stored and managed by said APwireless access point, to advise said STA of that effect;

said STAone of said plurality of wireless access terminal devices also comprising an updating unit updating an nth encrypted key stored and managed by said STAone of said plurality of wireless access terminal devices on reception of an nth encrypted key by delivered said STA-encrypted key delivery message from said APwireless access point.

11. (Currently amended): The updating system for an encrypted key for a wireless LAN as defined in claim 1 wherein:

said STAone of said plurality of wireless access terminal devices comprises means for notifying the APwireless access point of a lumped STA-encrypted key updating requesting message on detection of a preset factor;

said APwireless access point comprising means for notifying said SVkey management server device of the lumped STA-encrypted key updating request on reception of said lumped STA-encrypted key updating requesting message from said STAone of said plurality of wireless access terminal devices;

said SVkey management server device comprising means for verifying whether or not the encrypted key addressed to said STAone of said plurality of wireless access terminal devices can be delivered in a lump to said STAone of said plurality of wireless access terminal devices on reception of said lumped STA-encrypted key updating request from said APwireless access point; and

means for delivering encrypted key addressed to said STAone of said plurality of wireless access terminal devices in lump to said APwireless access point if said verifying means has verified that the encrypted key can be delivered in a lump to said STAone of said plurality of wireless access terminal devices;

said APwireless access point also comprising means for generating a lumped STA-encrypted key delivery message on reception in lump of said encrypted keys addressed to said STAone of said plurality of wireless access terminal devices from said SVkey management server device, and for notifying said STA of that effect;

said STAone of said plurality of wireless access terminal devices also comprising means for updating the encrypted keys stored in said STAone of said plurality of wireless access terminal devices in lump on reception of said lumped STA-encrypted key delivery message from said APwireless access point.

12. (Currently amended): An updating method for an encrypted key for a wireless LAN comprising:

- (a) providing one or more wireless access points (APs) provided on a LAN, said wireless access points being wirelessly connected to a plurality of one or more wireless access terminal devices (STAs) and in which data is encrypted and transmitted between the APwireless access point and the STA or STAs plurality of wireless access terminal devices; to effect communication termed as “encrypted communication”,
- (b) generating, by a key management server (SV) device, LAN-connected to said APwireless access point, k encrypted keys, k being not less than 1,

used for encrypted communication between said APwireless access point and said STA or STAsplurality of wireless access terminal devices;

- (c) storing and managing, by said SVkey management server device the generated k encrypted keys;
- (d) updating one of the encrypted key keys under a preset condition, and
- (e) delivering the updated encrypted key to said APwireless access point and to said STA or STAsplurality of wireless access terminal devices.

13. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 12 wherein:

    said SVkey management server device in updating said k encrypted keys stored and managed by said SVkey management server updates said k encrypted keys at a rate of one at a time.

14. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 12 wherein:

    said SVkey management server device in updating said k encrypted keys stored and managed by said SVkey management server device sequentially updates said k encrypted keys at a rate of one-by-one at a preset time interval.

15. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 12 wherein:

where k is greater than 1, said SVkey management server device sequentially updates all except a remaining one key (k-1) of said k encrypted keys stored in and managed by said SVkey management server device one-by-one at a first preset interval, said SVkey management server device

updating the remaining one key at a second interval longer than ~~for said first preset interval~~<sub>(k-1)</sub> encrypted keys.

16. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 13 wherein:

~~said AP~~wireless access point has encrypted communication with said STA or ~~STAs~~plurality of wireless access terminal devices using ~~another an~~ optional encrypted key other than ~~an~~ the nth encrypted key stored in and managed by said ~~AP~~wireless access point, during a period of time since updating of the nth encrypted key stored in and managed by said ~~AP~~wireless access point until the another encrypted key is updated next, where  $1 \leq n \leq k$ .

17. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 13 wherein:

~~said AP~~wireless access point has encrypted communication with said STA or ~~STAs~~plurality of wireless access terminal devices, sequentially using each one of k<sub>(k-1)</sub> encrypted keys, other than ~~an~~ the nth encrypted key stored in and managed by said ~~AP~~wireless access point, during a period of time since updating of the nth encrypted key stored in and managed by said ~~AP~~wireless access point until next updating of encrypted key, where  $1 \leq n \leq k$ .

18. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 13 wherein:

~~said AP~~wireless access point has encrypted communication with said STA or ~~STAs~~plurality of wireless access terminal devices, using an initially updated one of k encrypted keys stored in and managed by said ~~AP~~wireless access point.

19. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 16 wherein:

~~said plurality of wireless access terminal devices encryptSTA or STAs has/have encrypted communication with said APwireless access point, using an optional one of (k-1)said k encrypted keys, other than the nth encrypted key, stored in and managed by said STA or STAsplurality of wireless access terminal devices.~~

20. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 16 wherein:

~~said plurality of wireless access terminal devices communicateSTA or STAs has/have communication with said APwireless access point, sequentially using each one of said k(k-1) encrypted keys, other than the nth encrypted key, stored in and managed by said STA or STAsplurality of wireless access terminal devices.~~

21. (Currently amended): The updating method for an encrypted key for a wireless LAN as defined in claim 16 wherein:

~~said plurality of wireless access terminal devices communicateSTA or STAs has/have communication with said APwireless access point, using the last updated one of k encrypted keys stored in and managed by said STA or STAsplurality of wireless access terminal devices.~~

22. (New): An encryption key management system, comprising:

a key management server device, comprising:

an encryption key generating unit, and

an encryption key storage unit that stores k encryption keys

generated by said encryption key generating unit;

a wireless access point coupled to said key management server device;

and

a plurality of wireless access terminal devices wirelessly coupled to said

wireless access point, each of said wireless access terminal devices

storing said k encryption keys.

23. (New): The encryption key management system of claim 22, wherein one of said plurality of wireless access terminal devices generates and sends a request for a replacement key for one key of said plurality of encryption keys; and

wherein said key management server device sends a first message that is encrypted with another one of said plurality of encryption keys, said first message comprising said replacement key.

24. (New): The encryption key management system of claim 23, wherein said request comprises identifying information of said one of said plurality of wireless access terminal devices and wherein said key management server verifies said identifying information.

25. (New): The encryption key management system of claim 22, further comprising an open key encryption messaging protocol employed by said key management server device, said wireless access point, and said plurality of wireless access terminal devices, and wherein said key management server sends a second message comprising said plurality of encryption keys, and wherein said second message is encrypted by said open key encryption messaging protocol.